

CLAIMS

1. An image display apparatus comprising:

a two dimensional image displaying device;

5 an image providing device including a plurality of lenses disposed in front of and parallel to a display plane of said two dimensional displaying device;

an image signal generating device for generating an image signal to be inputted into said two dimensional image displaying
10 device.

2. An image display apparatus comprising:

a two dimensional image displaying device;

an image providing device including a plurality of lenses
15 disposed in front of and parallel to a display plane of said two dimensional displaying device, each lens having any one of a plurality of different focus distances; and

an image signal generating device for generating an image signal to be displayed on said two dimensional image displaying
20 device, corresponding to the focus distance of each lens.

3. The image display apparatus according to claim 1, wherein

said image providing device is configured by a plurality of stocked lens arrays.

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4. The image display apparatus according to claim 1, wherein

said image providing device is set to provide an image of said two dimensional image displaying device at fronts of a display plane of said two dimensional image displaying device.

5 5. The image display apparatus according to claim 1, wherein
 said image providing device is set to provide an image of said
two dimensional image displaying device at rears of a display plane
of said two dimensional image displaying device.

10 6. The image displaying apparatus according to claim 1,
 wherein
 the lens is an aspheric lens.

 7. The image displaying apparatus according to claim 1,
15 wherein
 the lens is a Fresnel lens.

 8. The image displaying apparatus according to claim 1,
 wherein
20 the lens is a grated index lens.

 9. The image displaying apparatus according to claim 1,
 wherein
 a member having a predetermined refractive index is
25 inserted between the lens and said two dimensional image
displaying device.

10. The image displaying apparatus according to claim 1,
wherein

a separating device for optically separating the plurality of
5 lenses is disposed between the plurality of lenses and said two
dimensional image displaying device.

11. The image displaying device according to claim 1, wherein
said two dimensional image displaying device is a cathode
10 ray tube displaying device.

12. The image displaying device according to claim 1, wherein
said two dimensional image displaying device is a liquid
crystal displaying device.

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13. The image displaying device according to claim 1, wherein
said two dimensional image displaying device is an
electroluminescence displaying device.

20 14. The image displaying device according to claim 1, wherein
said two dimensional image displaying device is a plasma
displaying device.

15. The image displaying device according to claim 1, wherein
25 the plurality of lenses are disposed corresponding to each of
pixels of said two dimensional image displaying device.

16. The image displaying apparatus according to claim 1,
wherein

the plurality of lenses are disposed corresponding to a
5 predetermined block of pixels of said two dimensional image
displaying device.

17. The image displaying apparatus according to claim 2,
wherein

10 the plurality of lenses are disposed along a horizontal line of
said two dimensional image displaying device.

18. The image displaying apparatus according to claim 2,
wherein

15 the plurality of lenses are disposed along a vertical line of
said two dimensional image displaying device.

19. The image displaying apparatus according to claim 1,
wherein

20 the image signal generating device includes at least one of
brightness information, color information, size information and
focus information, which are added to an image displayed on the
display plane.

25 20. The image displaying apparatus comprising:
a two dimensional image displaying device;

an image providing device made of a plurality of focus variable lenses disposed in front of and parallel to a display plane of said two dimensional image displaying device;

an image signal generating device for generating an image
5 signal to be displayed on said two dimensional image displaying device and information about a focus distance of the focus variable lens; and

a focus distance controlling device for controlling the focus distance of the focus variable lens, on the basis of the information
10 about focus distance.

21. The image displaying apparatus according to claim 20, wherein

the plurality of the focus variable lenses are disposed
15 corresponding to each of pixels of said two dimensional image displaying device.

22. The image displaying apparatus according to claim 20, wherein

20 the plurality of the focus variable lenses are disposed corresponding to a predetermined block of pixels of said two dimensional image displaying device.

23. The image displaying apparatus according to claim 20,
25 wherein

the focus variable lens is a liquid crystal lens.

24. The image displaying apparatus according to claim 23,
wherein

the liquid crystal lens is a lens system including a fix lens.

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25. The image displaying apparatus according to claim 24,
wherein

the fix lens is disposed at a liquid crystal side of the liquid
crystal lens, or an opposite side to the liquid crystal side, or at said
10 both side.

26. The image displaying apparatus according to claim 24,
wherein

the fix lens is an aspheric lens.

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27. The image displaying apparatus according to claim 24,
wherein

the fix lens is a Fresnel lens.

20 28. The image displaying apparatus according to claim 24,
wherein

the fix lens is a grated index lens.

29. The image displaying apparatus according to claim 20,
25 wherein

a member having a predetermined refractive index is

inserted between the focus variable lens and said two dimensional image displaying device.

30. The image displaying apparatus according to claim 20,
5 wherein

a separating device for optically separating the plurality of focus variable lenses is disposed between the plurality of focus variable lenses and said two dimensional image displaying device.

10 31. The image displaying apparatus according to claim 20, wherein

said two dimensional image displaying device is a cathode ray tube displaying device.

15 32. The image displaying apparatus according to claim 20, wherein

said two dimensional image displaying device is a liquid crystal displaying device.

20 33. The image displaying apparatus according to claim 20, wherein

said two dimensional image displaying device is an electroluminescence displaying device.

25 34. The image displaying apparatus according to claim 20, wherein

said two dimensional image displaying device is a plasma displaying device.

35. The image displaying apparatus according to claim 20,
5 wherein

the image signal generating device includes at least one of brightness information, color information, size information and focus information, which are added to an image displayed on the display plane.

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36. An image displaying method comprising:

disposing an image providing device made of a plurality of lenses in front of and parallel to a display plane of a two dimensional image displaying device, displaying an image by
15 inputting an image signal generated by an image signal generating device into the two dimensional image displaying device, and providing the displayed image by the image providing device at a position different from the display plane.

20 37. An image displaying method comprising:

disposing an image providing device made of a plurality of lenses, each lens having any one of focus distances, disposed in front of and parallel to a display plane of a two dimensional image displaying device, displaying an image by inputting an image signal
25 generated by an image signal generating device corresponding to each focus distance of the lenses into the two dimensional image

displaying device, and providing the displayed image by the image providing device at a position different from the display plane.

38. An image displaying method comprising:

5 disposing an image providing device made of a plurality of focus variable lenses disposed in front of and parallel to a display plane of a two dimensional image displaying device, displaying an image by inputting an image signal generated by an image signal generating device into the two dimensional image displaying device,
10 and providing the to-be-displayed image at any position by controlling a focus distance of the focus variable lens.